What is claimed is:

1. A fluid reactor comprising:

an annular wall having an inside wall;

a rotor having an outer wall placed within the outer annular wall, the inside wall of the outer annular wall and the outer wall of the rotor forming an annular fluid channel;

a fluid inlet in the outer annular wall in communication with the annular fluid channel;

a fluid outlet in the outer annular wall also in communication with the annular fluid channel;

a rotor control controlling the rotation of the rotor to provide laminar vortices in fluid in the annular fluid channel; and

an energy source for irradiating the fluid in the annular fluid channel with an anti-microbial amount of energy.

2. The fluid reactor of claim 1, wherein the energy source provides electromagnetic energy.

3. The fluid reactor of claim 2, wherein the electromagnetic energy irradiates fluid in the reactor.

4. The fluid reactor of claim 3, wherein the electromagnetic energy is provided in an anti-microbially effective amount.

5. The fluid reactor of claim 1, wherein the energy source is a lamp for providing ultraviolet light .

6. The fluid reactor of claim 1, wherein Taylor-Couette flow is established in fluid within the reactor when the rotor is rotated.

7. The fluid reactor of claim 1, wherein the Taylor-Couette flow comprises a plurality of circumferential vortices within the annular fluid channel.

8. The fluid reactor of claim 1, wherein the outer annular wall is transparent.

9. The fluid reactor of claim 1, wherein the outer annular wall comprises an energy source.

10. The fluid reactor of claim 1, further comprising a reflector around the outside of the outer annular wall.

11. A fluid reactor comprising:

an outer cylinder;

a rotor having a first annular channel between an outer wall and an inner cylinder, wherein the rotor is housed within the outer cylinder,

the outer cylinder having:

an inner annular wall defining a circular hollow for receiving the inner cylinder of the rotor, and

an outer annular wall defining a second annular channel between the outer annular wall and inner annular wall for receiving the outer wall of the rotor;

an inlet in fluid communication with the second annular channel; and

an outlet in fluid communication with the circular hollow.

12. The reactor of claim 11, wherein the outer cylinder further comprises an energy source.

13. The reactor of claim 12, wherein the energy source provides electromagnetic energy.

14. The reactor of claim 13, wherein the electromagnetic energy irradiates fluid in the reactor.

15. The reactor of claim 14, wherein the electromagnetic energy is provided in an anti-microbially effective amount.

16. The reactor of claim 12, wherein the energy source is a lamp for providing ultraviolet light.

17. The reactor of claim 11, wherein Taylor-Couette flow is established in fluid within the reactor when the rotor is rotated within the outer cylinder.

18. The reactor of claim 11, wherein the Taylor-Couette flow comprises a plurality of circumferential vortices within the first and second annular channels.

19. The reactor of claim 11, wherein the outer wall of the rotor is transparent.

20. The reactor of claim 11, wherein the inner and outer annular walls of the outer cylinder comprise an energy source.

21. The reactor of claim 1, further comprising a reflector around the outside of the outer annular wall.

22. A method for disinfecting a fluid comprising:

providing a fluid reactor having

a rotor having an outer wall placed within the outer annular wall, the inside wall of the outer annular wall and the outer wall of the rotor forming an annular fluid channel;

a fluid inlet in the outer annular wall in communication with the annular fluid channel;

a fluid outlet in the outer annular wall also in communication with the annular fluid channel;

controlling the rotation of the rotor to provide laminar vortices in fluid in the annular fluid channel;

introducing a fluid comprising a micro-organism into the fluid reactor; and

irradiating the fluid in the annular fluid channel with an anti-microbial amount of energy.

23. The method of claim 22, further comprising the step of establishing Taylor-Couette flow in fluid within the reactor by rotating the rotor within the outer cylinder.

24. The method of claim 23, wherein the Taylor-Couette flow comprises a plurality of circumferential vortices within the annular fluid channel.

25. The method of claim 22, wherein the energy source is a lamp for providing ultraviolet light.

26. The method of claim 22, wherein the fluid comprises wastewater.

27. The method of claim 22, wherein the fluid comprises an edible fluid.

28. The method of claim 27, wherein the edible fluid comprises milk, fruit juice, or a beverage.

29. The method of claim 22, wherein the ratio of penetration depth of the energy to the velocity boundary layer is less than about 1.

30. The method of claim 22, wherein the ratio of penetration depth of the energy to the velocity boundary layer is from about 0.5 to about 1.

31. The method of claim 22, wherein the fluid reactor comprises a plurality of fluid annular channels.

32. A method of disinfecting a fluid comprising:

inducing Taylor vortices in a fluid comprising an organism, wherein the Taylor number of the fluid is between about 40 to about 400; and

irradiating the fluid with an anti-microbial amount of energy.

33. The method of claim 32, wherein the anti-microbial amount of energy is about 400 J/m^2.

34. The method of claim 32, wherein the Taylor number is from about 75 to about 125.

35. The method of claim 32, wherein the organism comprises bacteria, fungi, protozoa, viruses, or a combination thereof.

36. The method of claim 32, wherein the energy is electromagnetic energy.

37. The method of claim 32, wherein the fluid comprises wastewater.

38. The method of claim 32, wherein the fluid comprises an edible fluid.

39. The method of claim 38, wherein the edible fluid comprises milk, fruit juice, or a beverage.

40. The method of claim 39, wherein the ratio of penetration depth of the energy to the velocity boundary layer is less than about 1.

41. The method of claim 32, wherein the ratio of penetration depth of the energy to the velocity boundary layer is from about 0.5 to about 1.